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## EUROPEAN PATENT APPLICATION

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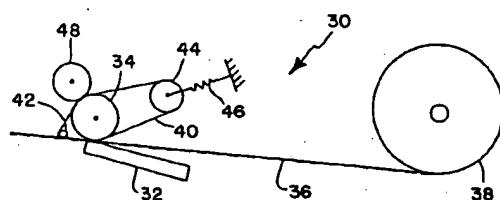
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54 Printing system for labels.

57 A printing system is described for use with linerless adhesive coated label stock (36). A print head (32) is disposed close to an endless belt (40) and the stock passed therebetween so that labels are printed on one side and adhered on the other side to the belt. Downstream of the print head the belt makes an abrupt change of direction which is effective to detach the now printed label stock therefrom.

FIG. 2



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The present invention relates to the printing of merchandising labels for wrapped packages.

In product merchandising, such as in the supermarket business for example, products are wrapped typically in stretch or shrink film, then conveyed to a labeler which automatically prints and attaches a label to the product package giving price, or other information about the product. The labels are provided in the form of a narrow continuous strip of paper stock and are joined at tearable perforations so that individual labels may be printed and separated from the strip for attachment to the package.

Label stock of the type currently in use is supplied in roll form. The labels are made from thermosensitive paper and have an adhesive backing on them so that they will adhere to the plastic wrapping of the package. In order to keep the labels from sticking to themselves while in roll form or during handling, the labels are mounted on a continuous backing, or liner. The typical liner is a paper material coated on one side with silicone. The silicone coating allows the labels to be readily separated from the liner prior to attachment to a package.

A disadvantage of using such conventional label stock having a liner is that the spent liner must be collected and disposed of. This typically involves providing a take-up reel for storing the used liner. The reel must be changed periodically in the operation of the labeling machine and the full reel must be discarded or replaced with an empty reel, involving down time of the label machine.

Label stock can be supplied in a linerless form. That is, the label material may be supplied in roll form but without a silicone-coated backing paper. The labels are coated on their print side with silicone so that their adhesive side will not stick appreciably to the print side when in roll form. A significant problem arises with using such linerless label stock in that the adhesive side of the labels tends to adhere to the conveying members when the label stock is transported through the printer. This is particularly a problem at the thermal print head where the label must be pressed against the print head to obtain an acceptably printed label. The typical means for pressing the label against the print head is neoprene roller juxtaposed next to the print head. Without a liner, the label stock will adhere to the print roller and be incapable of being transported to the package.

The present invention seeks to overcome these problems and to enable linerless label stock to be printed and employed in a commercial package labelling machine. In accordance with a first aspect of the present invention, there is provided apparatus for printing linerless labels having an adhesive coating on one side thereof, comprising:

a print head for printing indicia on the print side of said label;

a print roller disposed in close proximity to said

print head and adapted to press said labels against said print head during printing;

a peel bar positioned in spaced relation to said print roller; and

an endless belt adapted to travel around said print roller and peel bar;

wherein said labels are adhered to said belt at said print head and are conveyed to said peel bar where they are released from said belt.

In a second and alternative aspect thereof, the invention provides an apparatus for printing linerless labels having an adhesive coating on one side thereof:

a print head for printing indicia on the print side of said labels;

a print roller disposed in close proximity to said print head and adapted to press said labels against said print head during printing;

an idler pulley;

an endless belt adapted to travel around said print roller and said idler pulley;

The invention provides, in a third alternative aspect thereof, a method of printing indicia on a strip of printable material having an exposed adhesive coating on one side thereof comprising the steps of:

positioning a roller and a peel bar in spaced parallel relation to one another;

rotating an endless belt around said roller and peel bar such that said belt makes an abrupt change of direction at said peel bar;

positioning a print head in close proximity to said roller;

passing said strip of material between said print head and roller with said adhesive coating facing said roller such that indicia is printed on said strip and said strip is adhered to said belt; and

detaching said strip from said belt as the belt passes around said peel bar.

According to a fourth alternative aspect thereof, the invention provides a method for printing indicia on a strip of printable material having an exposed adhesive coating on one side thereof comprising the steps of:

positioning a first roller and a second roller in spaced parallel relation one to another;

rotating an endless belt around said rollers such that said belt makes an abrupt change of direction at said first roller;

positioning a print head in close proximity to said first roller;

passing said strip of material between said print head and said first roller with said adhesive coating facing said roller such that indicia is printed on said strip and said strip is adhered to said belt; and

detaching said strip from said belt as the belt passes around said first roller.

The invention is hereinafter more particularly described by way of example and with reference to the

accompanying drawings, in which:-

Fig. 1 is a schematic view of a prior art label printing apparatus for use with conventional label stock having a liner;

Fig. 2 is a schematic view of an embodiment of label printing apparatus in accordance with the invention for use with linerless label stock; and Fig. 3 is a schematic view of an apparatus in accordance with another embodiment of the present invention.

Referring initially to FIG. 1, a prior art label printing apparatus, designated generally by the reference numeral 10, includes a conventional thermal print head 12 disposed in close proximity to a print roller 14. Label stock 16 is supplied from a supply reel 18. The label stock 16 includes thermally sensitive paper 20 backed by a relatively non-stick liner 22. When the printing apparatus 10 is in operation, the label stock 16 is fed between the print head 12 and print roller 14 whereupon appropriate indicia is printed on the label paper 20. In the configuration illustrated, the print side of the label stock 16 is facing downwardly while the liner 22 is on the upward side of the label stock 16.

After the label stock 16 passes between the print head 12 and roller 14 the label stock travels to a peel bar 24 where the liner 22 is stripped from the label paper 20. The used liner 22 then proceeds around the peel bar 24 to a take-up reel 26 on which it is stored for later disposal. The label paper 20 continues to advance, with its adhesive side exposed, to a package labeling station (not shown).

Turning now to Fig. 2, the illustrated embodiment of label printing apparatus in accordance with the invention is designated by the reference numeral 30 and includes a conventional thermal print head 32 positioned adjacent a print roller 34. Label stock 36 of the linerless type is provided from a supply reel 38 with its adhesive side up, as viewed in FIG. 2. The label stock 36 passes between the print head 32 and print roller 34 where it is intercepted by an endless belt 40. The endless belt 40 passes around a peel bar 42, the print roller 34 and an idler pulley 44. The idler pulley 44 is tensioned by a suitable biasing means 46 so that the belt 40 remains taut as it is driven by the print roller 34.

The belt 40 is preferably formed from a fabric material coated on its outward surface with silicone. A porous roller 48 filled with liquid silicone may be positioned in contact with the belt 40 to apply a continuous film of silicone to the belt surface.

In operation of the apparatus 30 it can be appreciated that as the strip of linerless label stock 36 passes between the print head 32 and roller 34, where it is intercepted by the endless belt 40, the adhesive of the labels 36, which is facing upwardly as viewed in FIG. 2, causes the labels 36 to adhere to the belt 40 and be transported to the peel bar 42. At the peel bar 42 the belt 40 makes an abrupt change of direction

causing the belt 40 to separate from the label strip 36, whereupon the strip of labels 36 is free to proceed substantially in a straight line from the supply reel 38 through the printer 32 and then to a label applying station (not shown). The belt 40 thus serves as a temporary liner for the label stock 36 during the printing process and completely eliminates the need for lined label stock.

Fig. 3 illustrates another embodiment of our apparatus in which the belt passes around idler rollers 44 and 45 and the peel bar 42 is located outside the endless belt 40 adjacent to the print roll 34 where the peel bar functions to direct the labels 36 to the label applying station. In this embodiment, the print roll 34 has a small enough diameter that the labels separate from the belt 40 as the belt passes around the print roll 34 without positioning the peel bar 42 within the belt 40. Because the labels separate from the belt as the belt passes around the print roll and the peel bar functions merely to direct the labels to the label applying station, the peel bar could be eliminated altogether and other means can be used to direct the labels to the label applying station.

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### Claims

1. Apparatus for printing linerless labels having an adhesive coating on one side thereof, comprising:  
a print head for printing indicia on the print side of said labels;  
a print roller disposed in close proximity to said print head and adapted to press said labels against said print head during printing;  
a peel bar positioned in spaced relation to said print roller; and  
an endless belt adapted to travel around said print roller and peel bar;  
wherein said labels are adhered to said belt at said print head and are conveyed to said peel bar where they are released from said belt.
2. Apparatus according to claim 1 further comprising an idler pulley with said belt traveling around said print roller, peel bar and idler pulley.
3. Apparatus according to claim 1 comprising means for applying a non-stick coating to said belt as said belt is travelling around said print roller and peel bar.
4. An apparatus for printing linerless labels having an adhesive coating on one side thereof:  
a print head for printing indicia on the print side of said labels;  
a print roller disposed in close proximity to said print head and adapted to press said labels

against said print head during printing;  
an idler pull y;  
an endless belt adapted to travel around  
said print roller and said idler pulley;  
wherein said labels are adhered to said  
belt at said print head and are released from said  
belt as said belt travels around said print roller.

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5. The apparatus of claim 4 wherein a peel bar is  
positioned outside of said belt adjacent said print  
roll such that said peel bar directs said labels  
away from said belt.

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6. A method of printing indicia on a strip of printable  
material having an exposed adhesive coating on  
one side thereof comprising the steps of:

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positioning a roller and a peel bar in  
spaced parallel relation to one another;

rotating an endless belt around said roller  
and peel bar such that said belt makes an abrupt  
change of direction at said peel bar;

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positioning a print head in close proximity  
to said roller;

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passing said strip of material between said  
print head and roller with said adhesive coating  
facing said roller such that indicia is printed on  
said strip and said strip is adhered to said belt;  
and.

detaching said strip from said belt as the  
belt passes around said peel bar.

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7. A method for printing indicia on a strip of printable  
material having an exposed adhesive coating on  
one side thereof comprising the steps of:

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positioning a first roller and a second roller  
in spaced parallel relation one to another;

rotating an endless belt around said rollers  
such that said belt makes an abrupt change of di-  
rection at said first roller;

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positioning a print head in close proximity  
to said first roller;

passing said strip of material between said  
print head and said first roller with said adhesive  
coating facing said roller such that indicia is print-  
ed on said strip and said strip is adhered to said  
belt; and

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detaching said strip from said belt as the  
belt passes around said first roller.

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FIG. 1 PRIOR ART

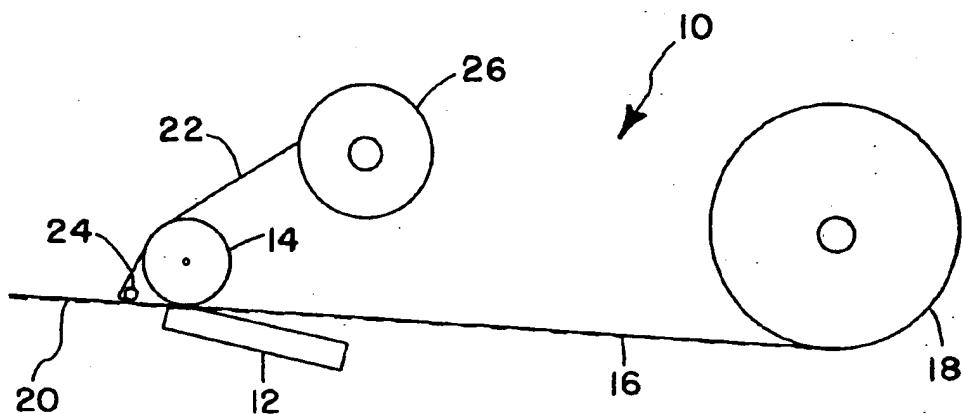


FIG. 2

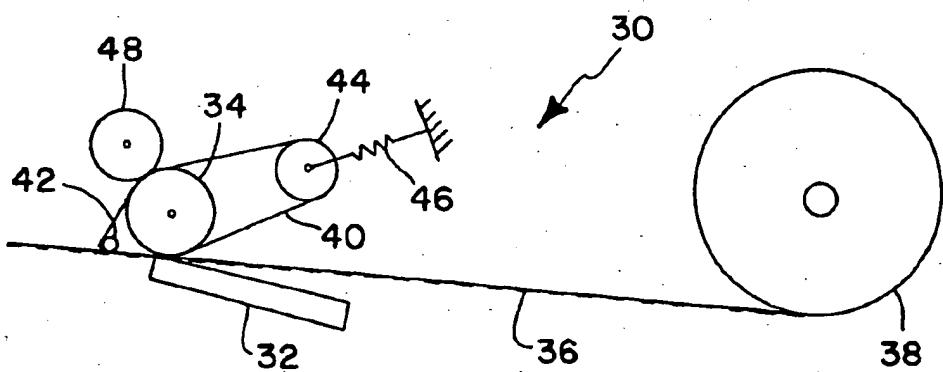
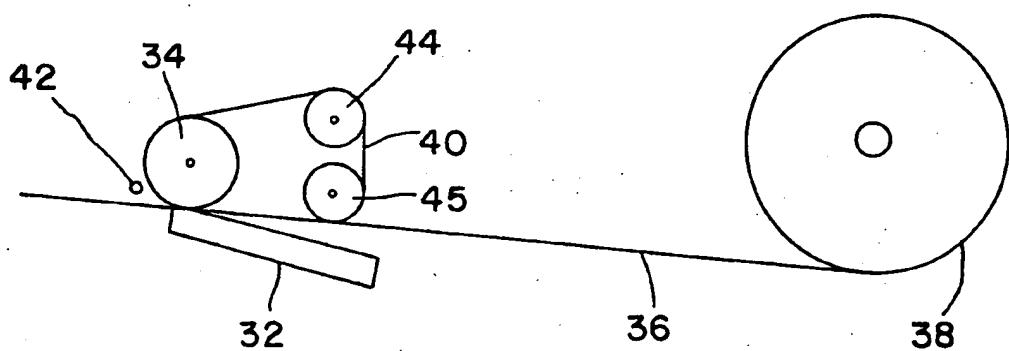


FIG. 3





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## EUROPEAN SEARCH REPORT

Application Number  
EP 94 30 5708

| DOCUMENTS CONSIDERED TO BE RELEVANT  |  |                      |   |                 |                                   |          |           |                  |                      |
|--|--|----------------------|---|-----------------|-----------------------------------|----------|-----------|------------------|----------------------|
| Category   | Citation of document with indication, where appropriate, of relevant passages      | Relevant to claim    | CLASSIFICATION OF THE APPLICATION (Int.Cl.) |                 |                                   |          |           |                  |                      |
| Y  | FR-A-2 414 763 (COSCO INDUSTRIES, INC.)<br>* page 4, line 1 - line 21; figure 4 *  | 1,6                  | B65C9/18<br>B65C9/46                        |                 |                                   |          |           |                  |                      |
| Y  | EP-A-0 416 802 (TOKYO ELECTRIC CO., LTD.)<br>* figures 3,4 *                       | 1,6                  |   |                 |                                   |          |           |                  |                      |
| P, Y   | EP-A-0 577 241 (MOORE BUSINESS FORMS, INC.)<br>* abstract; figure 1 *              | 2,7                  |   |                 |                                   |          |           |                  |                      |
| Y  | DE-A-36 09 789 (ESPERA-WERKE GMBH)<br>* column 2, line 56 - line 68; figures 1,2 * | 2,7                  |   |                 |                                   |          |           |                  |                      |
| A  | EP-A-0 071 191 (E.D.M. CORPORATION)<br>* page 14, paragraph 1; figure 2 *          | 1-7                  |   |                 |                                   |          |           |                  |                      |
| A  | US-A-2 574 674 (WALKER)  |                      |   |                 |                                   |          |           |                  |                      |
| A  | US-A-3 777 962 (TANGE ET AL.)  |                      |   |                 |                                   |          |           |                  |                      |
| TECHNICAL FIELDS<br>SEARCHED<br>(Int.Cl.)  |  |                      |   |                 |                                   |          |           |                  |                      |
| B65C   |  |                      |   |                 |                                   |          |           |                  |                      |
| <p>The present search report has been drawn up for all claims</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;">Place of search</td> <td style="width: 33%;">Date of compilation of the search</td> <td style="width: 33%;">Examiner</td> </tr> <tr> <td>THE HAGUE</td> <td>11 November 1994</td> <td>Martinez Navarro, A.</td> </tr> </table>   |  |                      |   | Place of search | Date of compilation of the search | Examiner | THE HAGUE | 11 November 1994 | Martinez Navarro, A. |
| Place of search  | Date of compilation of the search  | Examiner             |   |                 |                                   |          |           |                  |                      |
| THE HAGUE  | 11 November 1994   | Martinez Navarro, A. |   |                 |                                   |          |           |                  |                      |
| <p><b>CATEGORY OF CITED DOCUMENTS</b></p> <p>X : particularly relevant if taken alone<br/>     Y : particularly relevant if combined with another document of the same category<br/>     A : technological background<br/>     O : non-written disclosure<br/>     P : intermediate document</p> <p>T : theory or principle underlying the invention<br/>     E : earlier patent document, but published on, or after the filing date<br/>     D : document cited in the application<br/>     L : document cited for other reasons<br/>     &amp; : member of the same patent family, corresponding document</p> |  |                      |   |                 |                                   |          |           |                  |                      |